THE
ALGORITHM LITERACY PROJECT

Educational Guide

Diving Deeper into Algorithms

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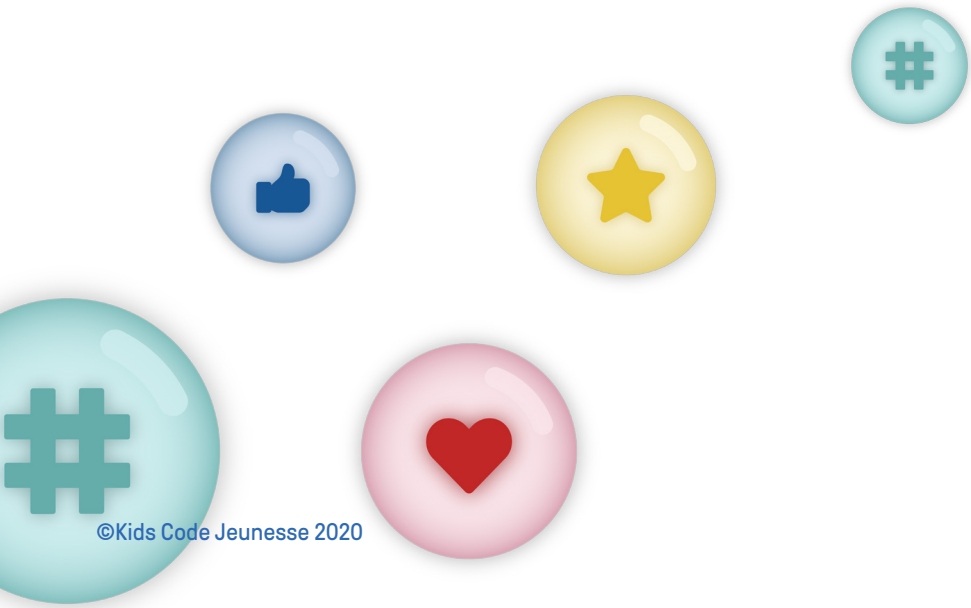
Introduction

An algorithm is any set of routines, rules, or commands. Our relationship with algorithms began long before computers were invented, but has intensified at a rapid pace in recent years with the advent of artificial intelligence (AI) . This education and activity guide focuses on the computer and AI algorithms that impact our relationship with online information and media.

Since many of us started using the internet, an entire generation has been born that has only experienced a world mediated by computer algorithms and driven, often invisibly, by the data these algorithms collect.

Today's kids and teens don't necessarily know that the world wasn't always like this, that there was a time when the consumption of information happened more slowly and involved more reflection and human decision making. They also don't know that the adults around them may not know how these algorithms work.

We hope that this campaign will provide three benefits to young people and the adults around them. First, to bring awareness to the increasingly interdependent relationship we are developing with these algorithms. Second, to provide ways for kids, parents and educators to start a discussion around this new reality. Finally, to suggest activities and direct kids, parents and educators to resources that will empower them to better understand what's happening behind the screen. This will empower kids and adults alike to collaborate and create the communities of practice that offer us opportunities to redress the imbalances that may arise from our evolving relationship with this increasingly powerful force in our society.



How to develop Algorithm Literacy

This discussion guide explores three big ideas:

1. **Media is always constructed.**

   AI algorithms play a significant new role in that construction, curating content for individual users in ways these users may not fully understand.

2. **With AI, this construction is driven by data.**

   Digital citizens will need new knowledge and better practices to share and protect our data.

3. **Our relationship with algorithms is interdependent.**

   To gain more power in this relationship, we can strengthen algorithm literacy alongside other thinking skills like critical thinking, problem solving and creative thinking. This will better ensure that the content mediated by algorithms is diverse and discoverable, and that we are better able to balance our online and offline activities.

Developing Algorithm Awareness

Going beyond digital literacy and developing digital wisdom starts with a curiosity about what's happening behind the screen. Any learning journey involves a period of recognizing and unlearning anything that might be a stumbling block on the path to new insights.

Many of us have become passive consumers of digital information, so an investigation of the causes and consequences of these learned behaviours can be a great place to start developing a willingness to build new relationships with algorithms.

Exploration questions:

1. **How much do you and the people around you know about algorithms, what they are and how they work?**

   Ask people in your school, home, or community to explain what an algorithm is and how it works. If you meet an expert, (someone who knows algorithms really well, like a programmer or computer scientist) ask how day-to-day algorithms (to-do lists, math problems, fire drills) are different from computer algorithms. How are AI algorithms different from traditional computer algorithms? How easy is it for the expert to explain this?

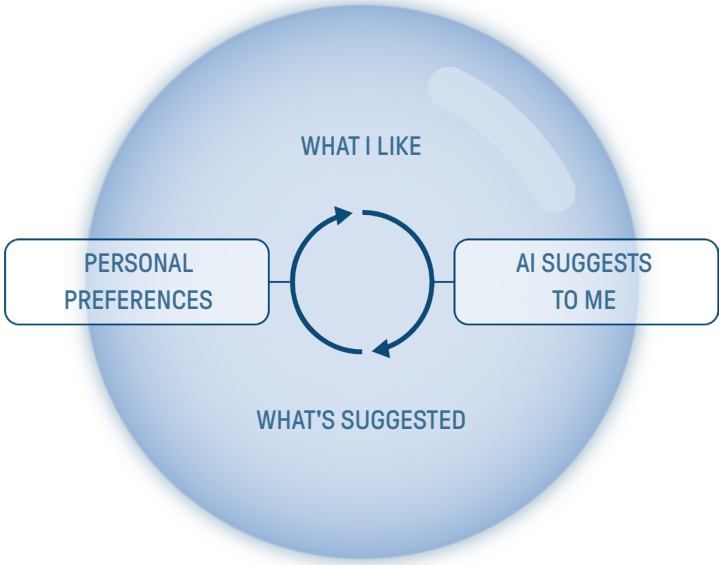
2. **How much impact do algorithms have in your life?**

   Consider how much of your daily information consumption is managed by algorithms. How often do you use search engines? Are you curious about how a search engine decides what is going to be most useful, interesting, important information for you to know? How often do you choose a YouTube video, movie or song recommended to you by a computer?

3. **What are the advantages of having your choices mediated by an algorithm?**

   And, what are the disadvantages of having choices mediated by an algorithm?

Preference Bubbles



AI's influence in your life.

Young people have likely noticed that content on the internet and on their phones has been customized to reflect their preferences. The increasing presence of "preference bubbles," a unique universe of information customized for each of us, is a result of the sophisticated application of AI and its use of algorithms.

AI can be extremely efficient in sorting through huge amounts of data. While bubbles can save us time looking for new content, and make suggestions that we might not be aware of, they can have negative consequences.

These habits can reward and strengthen impulsivity and distraction. Choices may be limited to formulaic content that is easy for computers to categorize. AI can't recognize that a movie may be interesting because it blends comedy and drama. It might just notice that you like comedy.

AI can lead us to new content we may not have heard of, but it can make complex, original material hard to find, and distract us from the effort it takes to find and learn about something new.

The good news is that by becoming more aware of these bubbles, and taking more control of what we choose to consume, we can have more influence on how AI determines our choices.

AI systems you know

An introduction to where and why AI is used by online platforms

Do we know online platforms that use AI?

- Who knows that Youtube and Instagram use AI?
- AI gets "smarter" as more data gets added to its data set. Thinking about YouTube, Instagram or Netflix, what type of data do these systems gather from users like ourselves?

These AIs use preferences as "training data." Every time we watch or like a video, comment or type into a search bar, this data is stored and used to predict user preferences.

Why?

- So you can access more interesting or relevant content.
- To encourage users to spend more time on the platform.

This comes with consequences

- We will see the same types of content because the AI will always recommend something similar to what we were searching for or previously chose. This is an example of the preference bubble in action.
- We may spend more time than we intended to on the platform.

Knowing your bubble

Ask the class what they are looking at online and what Instagram, TikTok or YouTube recommends for them.

Do all students see the same, or dramatically different recommendations, even though they are the same age, or living in the same neighborhood or town?

Or are they always looking at the same kind of videos and photos or interacting with similar links?

Do students know how to expand their bubble to find content that is more diverse, local or relevant to their needs?

Knowing your preference bubble gives you the power to:

- Check your emotions - once you are browsing online, how long do you want to stay? Is it how you want to spend your free time?
- Curate your content - talk to your friends, your parents, your teachers about what you look at, and get suggestions about what they like.
- You train the AI! Expand your bubble!

More Resources

→ Gender Shades shows the potential for discrimination and the need for diversity in the training data of AI.

→ TuringBox is a controlled environment that enables the behavioural study of, and the production of new, socially-aware AI

Digital Citizenship, Algorithms, and AI

These lessons are designed to help students develop responsible online habits, maintain a healthy relationship with their screen time and protect their digital privacy. Each lesson starts with a short class discussion to introduce the key concepts of AI. These activities can take place unplugged. The lesson ends with a short wrap-up discussion. The lessons are independent from one another and can be done over the course of a few days or a few weeks (i.e. one activity per week).

Activity: Circle of privacy

Recommended duration: 30 min

Learning objectives: Become familiar with the concepts of keeping your personal information safe from others. Understand the importance of your personal information, and why privacy settings online matter.

Materials: Computer or a pen and paper

Theme: Private vs. personal information

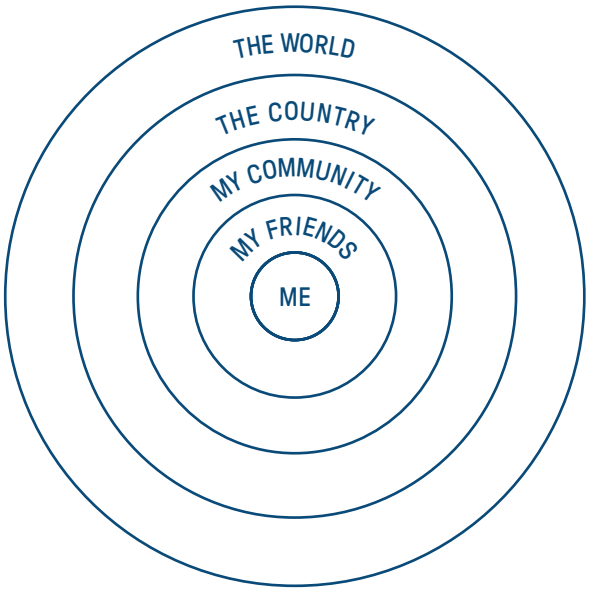
Warm-up discussion:

Ask: Have you ever seen photos of you or one of your friends online? If so, where? Have you shared pictures or videos online? On what platform? Have you ever had someone share a picture of you without your permission? How did you feel about that?

Note:
It is important to create a safe space for your students to share their experience.

Activity

Draw 5 concentric circles on the white board, and label them as shown below:



Ask the class to place each sentence in the circle that they believe represents who can access this information:

- A picture or a video on my phone
- A picture in the local paper
- A video on national television
- A video on a private YouTube channel or Instagram account
- A video on a public YouTube channel or Instagram account

Reflection

Online accounts can be private or public. When using 'private' settings, you can control who sees what you share. Be mindful that accounts are usually set to be public by default, and it is up to you to modify your privacy settings.

When you post something online, there is a chance that it will never disappear. You might be comfortable with sharing something today, but you might not feel the same way in the future.

Activity: Screen time diary

It is important to take a step back and check our emotions when engaging with technology. Platforms are designed to capture our attention, and it is very easy to get lost in the content and spend more time online than we intend to.

Algorithms are powered by repetition and are designed to encourage us to repeat behaviours and develop routines that make these platforms a daily part of our lives. We must be aware of behaviour loops: repeated behaviours that may not be in our best interest and that may make the problematic digital behaviours even worse. Creating our own routines--our own algorithms--is one of the best ways to regain control and restore balance to our lives.

Learning objectives: Reflect on screen time, online habits, and behaviour loops. Develop healthy habits and strategies around screen time management.

Materials: Computer or a pen and paper

Theme: Healthy online habits

Warm-up discussion

Ask students: Have you ever kept a diary? What do you do after school? Have you ever thought about how much time you spend online each day?

Note:
It is important to create a safe space for your students to share their experience.

Activity

Ask students to reproduce these 5 columns on their paper, and log all activities in front of a screen for a day, a week, or a month, including activities at school:

WHAT?	WHEN?	HOW LONG?	WITH WHOM?	HOW DID IT MAKE YOU FEEL?

Explain each column:

- What: what were you doing? (watching a video, watching TV, playing a video game)
- When: when was it ? (after school, before dinner, after dinner)
- How long: how much time? (20 minutes)
- With whom: who were you with (your parents, your sister, brother, friends, alone)
- How did it make you feel: watching funny cat videos can make you feel happy but playing video games can make you feel frustrated.

Reflection

What is influencing your online routines? Are you watching YouTube because you feel sad, lonely, or want a good laugh? Do you want to relax by playing a video game that gives you a fun challenge?

Is this repeated behaviour the best way to meet these needs, or might there be other behaviours that could solve the problem, like making new connections through a club or a group of people with shared interests? Would you consider experimenting with a different routine?

Timing yourself and checking your emotions are two great strategies to make sure you are not missing out on other aspects of life, while getting the most out of your online experience. Would you consider using these strategies in your offline life?

References

For more information on digital citizenship and other ideas of exciting activities to do with your class, check out Media Smarts and Common Sense Media.

Going Further

KCJ's Code in the Classroom workshops: Artificial Intelligence

This 2-hour workshop will introduce kids to the concepts behind Artificial Intelligence (AI), through computational thinking and interactive games and activities.

The workshop aims to give students the tools and knowledge needed to understand what AI is, how it affects our daily lives, and how it shapes our online experiences.

Code Club Canada

Code Club Canada is a volunteer driven network of coding clubs across Canada with a substantial bank of projects in both official languages.

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